Sandia National Laboratories / New Mexico

PROPOSAL FOR NO FURTHER ACTION ENVIRONMENTAL RESTORATION PROJECT SITE 15, TRASH PITS OPERABLE UNIT 1332

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Environmental Restoration Project

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PROPOSAL FOR
NO FURTHER ACTION
Environmental Restoration Project

Site 15, Trash Pits
OU 1332

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Prepared for the
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1. Introduction

1.1 ER Site 15, Trash Pits

Sandia National Laboratories/New Mexico (SNL/NM) is proposing an administrative no further action (NFA) decision based on confirmatory sampling for Environmental Restoration (ER) Site 15, Trash Pits (Frustration Site), Operable Unit (OU) 1332. ER Site 15, formerly included in OU 1272, was identified in the Hazardous and Solid Waste Amendment (HSWA) Module IV (Ref. 1) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518) (Ref. 2).

1.2 SNL/NM Confirmatory Sampling NFA Process

This proposal for a determination of a confirmatory sampling NFA decision has been prepared using the criteria presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (Ref. 3). Specifically, this proposal will "contain information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units (SWMU) at the facility that may pose a threat to human health or the environment" (as proposed in the Code of Federal Regulations (CFR), Section 40 Part 264.51[a] [2]) (Ref. 4). The HSWA Module IV contains the same requirements for an NFA demonstration:

> Based on the results of the RFI [RCRA Facility Investigation] and other relevant information, the Permittee may submit an application to the Administrative Authority for a Class III permit modification under 40 CFR 270.42(c) to terminate the RFI/CMS [corrective measures study] process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 CFR 270.42(c) (Ref. 1).

If the available archival evidence is not considered convincing, SNL/NM performs confirmatory sampling to increase the weight of the evidence and allow an informed decision on whether to proceed with the administrative-type NFA or to return to the site characterization program for additional data collection (Ref. 3).

The EPA acknowledged that the extent of sampling required may vary greatly, stating that:

> ...[T]he agency does not intend this rule (the second codification of HSWA) to require extensive sampling and monitoring at every SWMU...Sampling is generally required only in situations where there is insufficient evidence on which to make an initial release determination. ...[T]he actual extent of sampling will vary...depending on the amount and quality of existing information available (Ref. 5).

In requesting a confirmatory sampling NFA decision for ER Site 15, Trash Pits (Frustration Site), this proposal utilizes existing administrative/archival information, the results of confirmatory sampling and survey data to satisfy the permit requirements. This unit is eligible for an administrative NFA proposal based on one or more of the following criteria taken from the RCRA Facility Assessment Guidance (Ref. 6):

- Criterion A: The unit has never contained constituents of concern (COCs).
- Criterion B: The unit has design and/or operating characteristics that effectively prevent releases to the environment.
- Criterion C: The unit clearly has not released hazardous waste or constituents into the environment.

Specifically, ER Site 15 is being proposed for a confirmatory sampling NFA decision because the SWMU never contained hazardous waste or constituents (Criterion A), and the unit has not released hazardous waste or constituents into the environment (Criterion C).

1.3 Local Setting

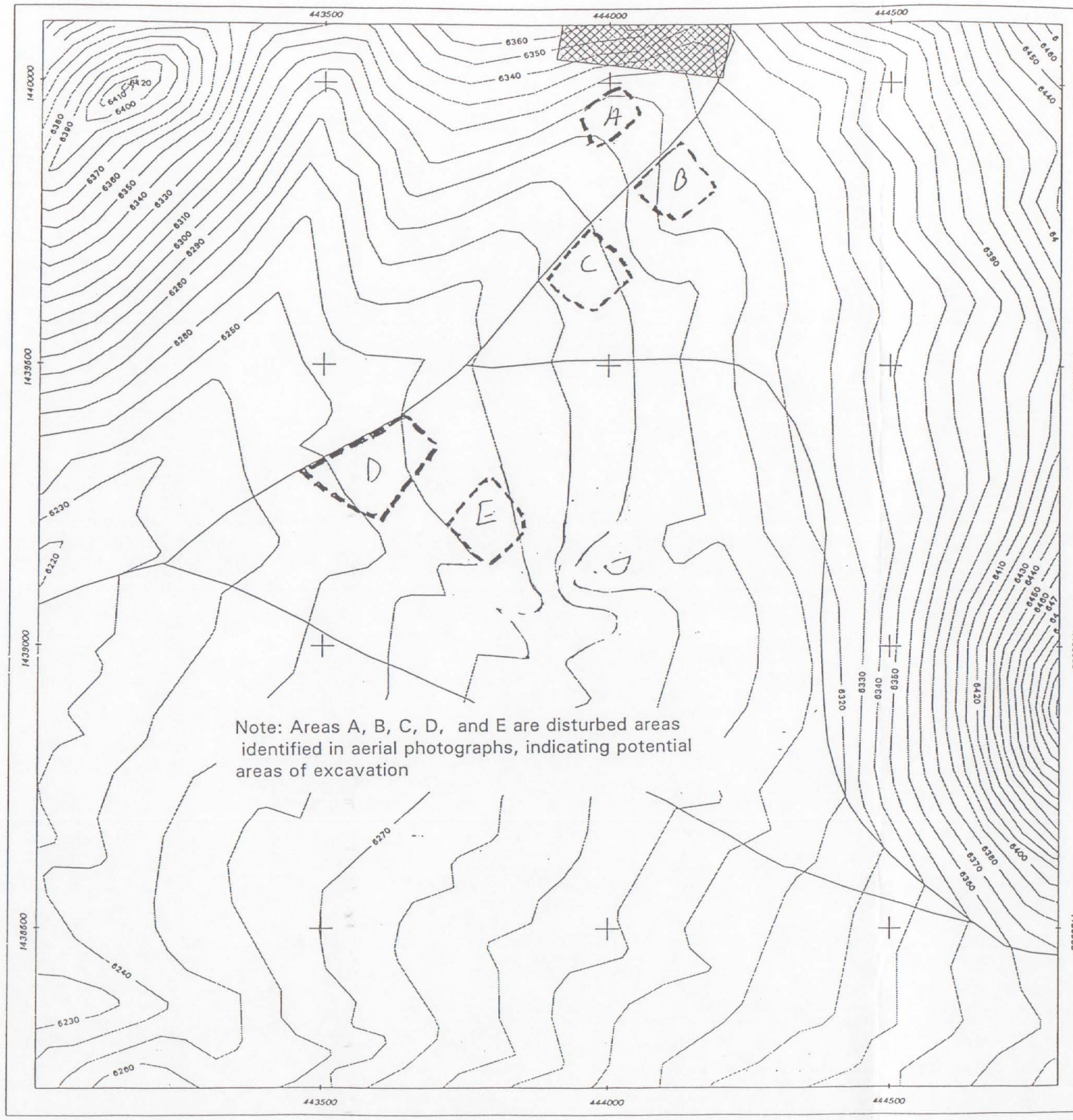
OU 1332, known as the Foothills Test Area, covers approximately 9,333 acres in the central portion of an area known as the Coyote Test Field, which is located in the eastern portion of Kirtland Air Force Base (KAFB) in an unrestricted remote test area for the Department of Defense (DoD) and Department of Energy (DOE) activities. ER sites in OU 1332 are located near the boundary between the United States Forest Service Withdrawn Area of the Cibola National Forest and KAFB. ER Site 15 is located on USFS land withdrawn from the Bureau of Land Management (BLM) and permitted to DOE.

The site is located in a canyon at the western edge of the Manzanita Mountains in the southeastern portion of the Coyote Canyon Test Field (Figure 1). Bedrock in the area is comprised of Precambrian-age rocks, primarily biotite-granites, metavolcanic and metasedimentary rocks. The soils are comprised of a thin veneer of poorly weathered regolith derived from the underlying bedrocks. The appearance of multiple outcrops in the road cuts and the surrounding terrain indicate a regolith thickness on the order of 2 to 3 feet. The depth to ground water at ER Site 15 is unknown but, from observations of nearby monitoring wells, occurs in the fractured granitic bedrock.

2. History of the SWMU

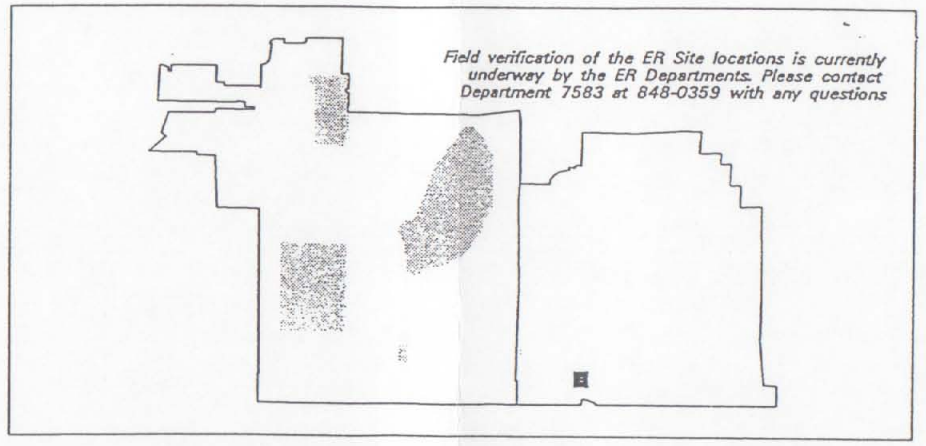
2.1 Sources of Supporting Information

In preparing to request a confirmatory sampling NFA decision for ER Site 15, a background study was conducted to collect available and relevant site information. Background information sources included existing records and reports of site activity. In addition, interviews were conducted with SNL/NM staff and contractors familiar with site operational



LEGEND

- KAFB Boundary
- Road
- Fence
- Contour
- Building
- Technical Area
- Potential Location - ER Site 15
- ER Site 67



Field verification of the ER Site locations is currently underway by the ER Departments. Please contact Department 7583 at 848-0359 with any questions

Sandia National Laboratories, New Mexico
Environmental Operations Geographic Information System

Figure 1

Environmental Restoration Site Atlas
ER Site No. 15
Trash Pits(Frustration Site)

Compiled by photogrammetric methods from aerial photography dated March 1989, March 1990, September 1991 and July 1992

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone 1927 North American Horizontal Datum, 1929 North American Vertical Datum

Atlas Mapsheet ERS-15

GIS MAP-ID = 940604-15 SNL EOC GIS DEPT 7512 Map By: spbreye 18-JAN-1995

history. The study was completely documented and has provided traceable references which sustain the integrity of this proposal.

The following information sources, hierarchically listed with respect to assigned validity, were available for use in the evaluation of ER Site 15:

- Nine soil sample analyses in the ER Site 15 area
- Two preliminary survey reports, including data from radiation surveys, and one unexploded ordnance/high explosives (UXO/HE) survey
- Eight interviews with six personnel familiar with the activities at ER Site 15 (current and retired)
- Miscellaneous information sources including SNL/NM personnel correspondence (memoranda, letters, and notes) regarding ER Site 15
- Photographs and field notes from numerous site inspections conducted by SNL/NM staff
- The Comprehensive Environmental Assessment and Response Program (CEARP) Phase I Report (Ref. 7) and CEARP records contained in the Environmental Operations Record Center
- The RCRA Facility Assessment (RFA) Report (Ref. 8)

Using this information, a brief history of ER Site 15 and a discussion of all relevant evidence regarding past waste practices and releases at the site have been prepared and are presented in this proposal for a confirmatory NFA decision.

2.2 Previous Audits, Inspections, and Findings

ER Site 15 was originally listed as a potential release site based on the CEARP interviews in 1985 (Ref. 7). The CEARP report noted that there were three shallow pits filled with trash at the Frustration Site (ER Site 67). Each pit was approximately 20 feet by 20 feet, located at the southwest end of ER Site 67. Based on CEARP information, the nature and origin of the trash is unknown, and the depths of the pits are unknown. It is unknown whether chemical or radiological wastes were disposed of in the pits.

Later, the EPA conducted a RCRA Facility Assessment (Ref. 8). No additional information was discovered during this assessment.

2.3 Historical Operations

The area was used by the military during World War II for ordnance testing. Numerous shells, some of which may still be live, and pieces of shrapnel are scattered over much of the

area. Personnel at KAFB determined that removal and/or disposal of the shells would be too costly. The shells are considered a United States Air Force (USAF) responsibility (Ref. 7). Environmental restoration activities conducted in 1994 have included UXO/HE and surface radiation surveys of the vicinity.

Site 15 became an ER site based solely on the information presented in the 1985 CEARP. The CEARP states that limited information is available on the wastes associated with the use of this site. The nature and origin of the trash are unknown and the depths of the pits are unknown. There is no information indicating chemical or radiological wastes were disposed of in the pits.

It is possible that the trash disposed of in these alleged pits was associated with the nearby Frustration Seismic Station. The seismic station is located in a horizontal mine adit, and was active during the 1960s and 1970s. However, interviews with several SNL/NM personnel who worked at the Frustration Seismic Station did not result in any information about the existence of trash pits in the area. The type of work done at the seismic station was not of a nature to generate any hazardous wastes. Explosive or other destructive testing would not have been conducted at the same time in the vicinity because it would have damaged the sensitive seismic instrumentation. The Frustration Site is a separate site, ER Site 67, also being proposed for NFA.

3. Evaluation of Relevant Evidence

3.1 Unit Characteristics

Incompletely documented interviews form the basis for many of the sites listed in the CEARP, and thus followup interviews with the specific persons who initially reported the existence of the pits were not possible. The site name, Trash Pits (Frustration Site) which appears in this document indicates that its presumed location was in the vicinity of the Frustration Seismic Station.

3.2 Operating Practices

Although the seismic station is the most likely source of any waste material, information obtained from recent interviews with personnel who worked at the seismic station and in the surrounding Coyote Canyon Test Field area supports the conclusion that no radioactive or hazardous materials were used in the area or disposed of in any pits (Ref. 2, 9, 10, 11, 12, 13, and 14). Several of the people interviewed also indicated that past waste practices at SNL/NM required all radiological wastes be disposed of in the controlled landfills operated at that time, either at Manzano Base, Technical Area (TA)-II, or TA-III (Ref. 15).

3.3 Presence or Absence of Visual Evidence

Aerial photographs from the 1960s though late 1980s were analyzed for potential "disturbed soil areas" that may indicate the pit locations (Figure 1). Areas A through E (shown in

Figure 1) were identified as the most likely pit locations in the Frustration Site vicinity. Field reconnaissance of these areas identified on the aerial photograph indicate that Area A is a small mine-tailings pile. Area B is a rocky pile that may have been produced when the switchback in the road was cut. Area C is a small, flat, cleared area that may have been scraped or graded as part of road construction, and has no indication of pits or excavation. Area D, similar to Area C, is an eroded area which appears to be related to surface drainage toward the arroyos. A small pile of trash, broken glass, scrap wood, and rusty cans is the only evidence of trash in this area. Area E, scraped and devoid of vegetation, appears to consist of material from the nearby mining operations which occurred in the past. Other than these materials, there was no evidence of trash or excavation in any of these five areas (Ref. 16).

These areas were also verified on the ground by Sandia ER personnel. From observation of the bedrock outcrops in the area, it appears that the soil (regolith) thickness is on the order of 2 to 3 feet, which suggests there is insufficient overburden available to excavate a pit to a depth adequate for disposal of any waste material.

The interview process, aerial photographic analysis, visual inspections of the site, and surface radiation survey have failed to provide any definitive information that the three alleged pits exist or constitute a hazardous waste site.

3.4 Results of Previous Sampling Surveys

A large portion of the area surrounding the Frustration Mine was surveyed as part of an UXO survey, conducted by KAFB Explosive Ordnance Disposal (EOD) in 1993, and no pits were found (Ref. 17). Surveyors were specifically instructed to look for any signs of disturbed earth. It was noted during field reconnaissance of the area that the soils were very thin and that digging any kind of pit would be very difficult, and therefore unlikely.

Although their use as disposal pits is unlikely, areas A, B, C, D, and E were flagged in the field as possible pit locations, and surface surveyed by RUST-Geotech for evidence of elevated gamma radiation. None of these areas had radioactivity levels above ambient background ($\geq$ 1.3 x background) (Ref. 18).

3.5 Assessment of Gaps in Information

Based on available information, there is no definitive evidence that the trash pits even existed at this site or that hazardous or radioactive materials were ever used. Interviews showed that SNL/NM personnel familiar with the Frustration Site, which is adjacent to ER Site 15, are unaware of the existence of trash pits. Likewise, from aerial photographs and site visits, there is no definitive evidence of burial pits existing in this area.

3.6 Confirmatory Sampling

Although available evidence suggests that the existence of pits containing hazardous or radioactive materials at this area is improbable, if not impossible due to the thin soil cover at the site, a confirmatory soil sampling program was implemented to verify the presence or absence of contaminants at ER Site 15.

The thin soil cover made the use of subsurface drilling methods impractical; therefore, surface soil samples were collected. Areas C and D were selected as the sampling sites since these two areas appeared from site visits to be the most likely locations for disposal sites (see Appendix A, Figure 1). Appendix A contains a description of the sampling and analysis plan for ER Site 15. Tables 1 and 2 summarize the analytical results (see also Appendix B).

3.6.1 Results

Table 1 shows the activity of radioactive materials detected above the minimum detection levels (MDLs) at ER Site 15 and compares them to background values for samples collected at SNL/NM (Ref. 8). This demonstrates that for the radionuclides for which background levels are available (uranium-238 [U-238], thorium-234 [Th-234], lead-214 [Pb-214], radium-224 [Ra-224], lead-212 [Pb-212], bismuth-212 [Bi-212], and cesium-137 [Cs-137]), the activities for these parameters at ER Site 15 are clearly within the range for background values at SNL/NM. The elevated activities of potassium-40 (K-40) is probably attributable to the presence of potassic-feldspar, a common mineral in rocks of granitic composition which are typical of the foothills area of SNL/NM.

Table 2 summarizes analytical results at ER Site 15 for metals and comparison to background values at SNL/NM.

RCRA metals, silver (Ag), arsenic (As), cadmium (Cd), and mercury (Hg), were below detection limits at ER Site 15. RCRA metals barium (Ba) and chromium (Cr) are below background levels at SNL/NM.

Lead (Pb) concentrations range from 21 to 320 parts per million (ppm) at ER Site 15. These concentrations exceed the maximum background level for lead at SNL/NM, which is 110 ppm. This anomaly is believed to be caused by the presence of lead mineralization at ER Site 15, which may occur in the form of galena, a naturally occurring lead sulfide (PbS) commonly associated with fluorite mines in the area (Ref. 21).

The Frustration Site (ER Site 67) was at one time a fluorite mine. Two mines located near the Frustration Site (ER Site 67) have been documented as containing PbS mineralization: the Blackbird mine located 3 miles east of Coyote Springs; and the Galena King Prospect, in the Manzanita Mountains, located 5 miles southeast of Coyote Springs. The Galena King Prospect was actually worked for the extraction of Pb. Pb mineralization is associated with the fluorite mineralization in the area, and the elevated Pb value at ER Site 15 is probably naturally occurring.

Table 1. Summary of Gamma Spectrometry Analyses Scoping Sampling ER Site 15[a]

Analytes Above Detection Levels	Results (activities in pCi/g)	Background Levels (pCi/g)
Uranium-238	ND - 1.14	3E-3 - 2.06[b]
Thorium-234	ND - 1.47	3.24E-1 - 3.0[b]
Radium-226	ND - 2.20	0.23 - 4.2[c]
Lead-214	5.83E-1 - 1.07	2.9E-1 - 1.4[b]
Thorium-232	9.06E-1 - 1.14	0.10 - 3.4[c]
Radium-228	8.23E-1 - 1.32	0.10 - 3.4[c]
Actinium-228	1.03 - 1.40	NA
Thorium-228	ND - 1.37	0.10 - 3.4[c]
Radium-224	1.88 - 1.34E+1	4.3E-1 - 9.7E-1[b]
Lead-212	1.01 - 1.40	1.0E-1 - 1.4[b]
Bismuth-212	8.9E-1 - 1.62	4.0E-1 - 2.7[b]
Thallium-208	8.55E-1 - 1.15	NA
Cesium-137	ND - 7.96E-1	4.0E-3 - 1.8[b]
Potassium-40	2.28E+1 - 3.11E+1	1.9E-1 - 3.1E-1[b]

Notes:

pCi/g = picocuries per gram.
ND = Nondetect (the analyte was not observed above the minimum detection level [MDL]).
NA = Not analyzed.

[a]For full analytical results, see Appendix B.2.
[b]From IT, October 1994, "Background Concentrations of Constituents of Concern to the Sandia National Laboratories New Mexico Environmental Restoration Project" (Ref. 19).
[c]From EPA, April 1994, draft "Technical Summary Report Supporting the Development of Standards for the Cleanup of Radioactively Contaminated Sites" (Ref. 20).

Table 2. Summary of RCRA Metals Analytical Results

Analytes Above Detection Levels[a]	Concentrations (ppm)	Background Levels[b] at SNL (ppm)
Silver	ND	0.1 - 8.5
Arsenic	ND	NA
Barium	71 - 160	0.13 - 730
Cadmium	ND	NA
Chromium	ND - 13	0.01 - 58.1
Mercury	ND	NA
Lead	21 - 320	1.0 - 110.0
Selenium	ND	NA

Notes:

ppm = parts per million
ND = Nondetect (the analyte was not observed above the minimum detection level [MDL]). (For MDLs, see the Metals Analytical Results Summary in Appendix B.)
NA = Not analyzed.

[a]Samples were also analyzed for aluminum, beryllium, calcium, cobalt, copper, iron, magnesium, manganese, nickel, antimony, thallium, vanadium, and zinc (see Metals Analytical Results Summary in Appendix B).
[b]From SNL/NM, October 1994, "Background Concentrations for Constituents of Concern to the Sandia National Laboratories New Mexico Environmental Restoration Project" (Ref. 19).

The metals beryllium (Be), cobalt (Co), copper (Cu), nickel (Ni), antimony (Sb), vanadium (V), zinc (Zn) are either nondetects or are below background levels at SNL/NM. The remaining metals, aluminum (Al), calcium (Ca), iron (Fe), magnesium (Mg), and manganese (Mn) are not listed hazardous materials and therefore not of concern.

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

SNL/NM is proposing a confirmatory sampling NFA decision for ER Site 15 because the unit never contained hazardous wastes or constituents (Criterion A) and the unit has not released hazardous waste or constituents into the environment (Criterion C).

There is no knowledge of any waste management activities at this site, and no visual or analytical evidence of hazardous waste or constituents.

All available evidence is in contradiction to the original information provided in the CEARP and RFA. The available evidence includes specifically:

1. Individuals familiar with the Frustration Site, which is associated with ER Site 15, are not aware of any trash pits in the area.

2. Site reconnaissance of the local geology indicate that the soil cover is too thin to adequately construct a trash pit.

3. Aerial photographic analyses accompanied with site reconnaissance could not provide any definitive information that the alleged pits ever existed.

4. Confirmatory sampling activities indicate the radiological and metal constituents detected in the soil are naturally occurring.

4. Conclusion

Based on the evidence cited within this proposal, no potential remains for a release of hazardous waste (including hazardous constituents) that may pose a threat to human health or the environment. Therefore, ER Site 15 is recommended for an NFA determination.

5. References

5.1 ER Site References

Section 5.1 contains a comprehensive bibliographical list of the documents relating to ER Site 15. This list is arranged numerically by reference citation in the text.

1. United States Environmental Protection Agency (EPA), August 1993. Module IV of RCRA Permit No. NM5890110518, EPA Region 6, issued to Sandia National Laboratories, Albuquerque, New Mexico.

2. United States Environmental Protection Agency (EPA), August 1992. Hazardous Waste Management Facility Permit No. NM 5890110518, EPA Region 6, issued to Sandia National Laboratories, Albuquerque, New Mexico.

3. Sandia National Laboratories/New Mexico (SNL/NM), February 1995, "Program Implementation Plan for Albuquerque Potential Release Sites," Sandia National Laboratories, Albuquerque, New Mexico.

4. United States Environmental Protection Agency (EPA), July 1990. "Corrective Action for Solid Waste Management Units (SWMU) at Hazardous Waste Management Facilities Proposed Rule," *Federal Register*, Vol. 55, Title 40, Parts 264, 265, 270 and 271.

5. United States Environmental Protection Agency (EPA), December 1987. "Hazardous Waste; Codification Rule for 1984 RCRA Amendments; Final Rule," *Federal Register*, Vol. 52, Title 40, Parts 144, 264, 265, 270, and 271, Environmental Protection Agency, Washington, DC.

6. United States Environmental Protection Agency (EPA), October 1986. "RCRA Facility Assessment Guidance," EPA/530-86-053, PB87-107769, Environmental Protection Agency, Washington, DC.

7. United States Department of Energy (DOE), September 1987. "Draft Comprehensive Environmental Assessment and Response Program, Phase 1: Installation Assessment," Department of Energy, Washington, DC.

8. United States Environmental Protection Agency (EPA), April 1987. RCRA Facility Assessment Draft Report, "Final RCRA Facility Assessment Report of Solid Waste Management Units at Sandia National Laboratory Albuquerque, New Mexico," Environmental Protection Agency, Washington, DC.

9. Sandia National Laboratories/New Mexico (SNL/NM), 1985. Environmental Operations Records Center Reference No. ER\7585\1332\INT\85-030, Sandia National Laboratories, Albuquerque, New Mexico.*

10. Sandia National Laboratories/New Mexico (SNL/NM), 1985. Environmental Operations Records Center Reference No. ER\7585\1332\INT\85-034, Sandia National Laboratories, Albuquerque, New Mexico.*

11. Sandia National Laboratories/New Mexico (SNL/NM), 1985. Environmental Operations Records Center Reference No. ER\7585\1332\INT\85-035, Sandia National Laboratories, Albuquerque, New Mexico.*

12. Sandia National Laboratories/New Mexico (SNL/NM), 1990. Environmental Operations Records Center Reference No. ER\7585\1332\REP\90-018, Sandia National Laboratories, Albuquerque, New Mexico.*

13. Sandia National Laboratories/New Mexico (SNL/NM), 1993. Environmental Operations Records Center Reference No. ER\7585\1332\INT\93-013, Sandia National Laboratories, Albuquerque, New Mexico.*

* The SNL/NM reference numbers refer to a SNL/NM Records Center coding system intended to maintain the confidentiality of SNL/NM employees.

14. Sandia National Laboratories/New Mexico (SNL/NM), 1994. Environmental Operations Records Center Reference No. ER\7585\1332\67\INT\94\011, Sandia National Laboratories, Albuquerque, New Mexico.*

15. Sandia National Laboratories/New Mexico (SNL/NM), 1994. Environmental Operations Records Center Reference No. ER\7585\1332\INT\94-05, Sandia National Laboratories, Albuquerque, New Mexico.*

16. Sandia National Laboratories/New Mexico (SNL/NM), 1985. Environmental Operations Records Center Reference No. ER\7585\1332\INT\85-016, Sandia National Laboratories, Albuquerque, New Mexico.*

17. Young, M., and C. Byrd, September 1994. "Unexploded Ordnance/High Explosives (UXO/HE) Visual Survey of ER Sites Final Report," Sandia National Laboratories, Albuquerque, New Mexico.

18. RUST-Geotech, December 1994. "Final Report, Surface Gamma Radiation Surveys for Sandia National Laboratories/New Mexico Environmental Restoration Project," prepared for Sandia National Laboratories, Albuquerque, New Mexico.

19. IT Corporation, October 1994. "Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico-Environmental Restoration Project Phase II: Interim Report," IT Corporation, Albuquerque, New Mexico.

20. United States Environmental Protection Agency (EPA), April 1994. Draft, "Technical Summary Report Supporting the Development of Standards for the Cleanup of Radioactively Contaminated Sites," Environmental Protection Agency, Washington, DC.

21. Rothrock, H. E., C. H. Johnson, and A. D. Hahn, 1946. "Fluorspar Resources of New Mexico," Bulletin 21, The New Mexico Bureau of Mines and Mineral Resources.

5.2 Reference Documents

Sandia National Laboratories/New Mexico (SNL/NM), 1982. Environmental Operations Records Center Reference No. ER\7585\1332\67\82-041, Sandia National Laboratories, Albuquerque, New Mexico.*

Sandia National Laboratories/New Mexico (SNL/NM), 1993. Environmental Operations Records Center Reference No. ER\7585\1332\67\INT\93-020, Sandia National Laboratories, Albuquerque, New Mexico.*

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Sandia National Laboratories/New Mexico (SNL/NM), 1993. Environmental Operations Records Center Reference No. ER\7585\1332\67\COR\93-040, Sandia National Laboratories, Albuquerque, New Mexico.*

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October 13, 2003

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